

ORIGINAL ARTICLE - GASTROENTEROLOGY (CLINICAL)

Helicobacter pylori Management in ASEAN Countries: The Bangkok II Consensus Report

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ABSTRACT

Background and Aim: *Helicobacter pylori* infection remains a major cause of gastric cancer, peptic ulcer disease, and dyspepsia-related morbidity across ASEAN. Since the first Bangkok Consensus Report in 2018, major advances have emerged in epidemiology, antimicrobial resistance, diagnostics, and eradication therapy. The Bangkok II Consensus Report aimed to provide updated evidence-based recommendations tailored to Southeast Asia.

Abbreviations: ASEAN, Association of Southeast Asian Nations; BQT, bismuth quadruple therapy; CQ, clinical question; GIM, gastric intestinal metaplasia; GRADE, Grading of Recommendations Assessment Development and Evaluation; *H. pylori*, *Helicobacter pylori*; PCAB, potassium-competitive acid blocker; PPI, proton pump inhibitor; RCT, randomized controlled trial; SAT, stool antigen test; UBT, urea breath test; WG, working group.

Methods: A multidisciplinary panel from ASEAN and international partner countries updated regional guidance through three working groups covering epidemiology and indications for treatment, diagnostic testing and confirmation of eradication, and treatment strategies. Clinical questions and statements were developed from structured evidence review. Evidence quality and recommendation strength were graded using GRADE, with consensus defined as $\geq 80\%$ agreement.

Results: Twenty-one clinical questions were addressed. The consensus emphasizes that *H. pylori* remains an important public health problem in ASEAN; eradication is central to gastric cancer prevention and ulcer management; diagnostic tests should be selected according to indication and local availability; 14-day bismuth quadruple therapy is the preferred empirical first-line regimen because of high clarithromycin resistance; PCAB-based regimens are promising alternatives; and posttreatment confirmation of eradication should be routinely performed.

Conclusions: The Bangkok II Consensus Report provides regionally relevant recommendations integrating antimicrobial resistance, healthcare disparities, and resource-adapted strategies across ASEAN, addressing gaps in global guidelines and supporting reduction of *H. pylori*-associated disease, including gastric cancer, across Southeast Asia.

1 | Introduction

Helicobacter pylori (*H. pylori*) infection remains one of the most important chronic bacterial infections worldwide and plays a central role in the pathogenesis of peptic ulcer disease, gastric adenocarcinoma, and mucosa-associated lymphoid tissue lymphoma. The International Agency for Research on Cancer classified *H. pylori* as a Group 1 carcinogen in 1994, and contemporary global estimates indicate that this pathogen is responsible for most noncardia gastric cancers worldwide [1, 2]. Because gastric cancer remains a major cause of cancer-related mortality in Asia, effective *H. pylori* detection and eradication strategies are of major public health importance [3, 4].

Within ASEAN, the burden of *H. pylori* infection and its complications remain substantial but heterogeneous. Prevalence varies considerably across and within countries according to socioeconomic conditions, sanitation, transmission dynamics, and population characteristics, whereas gastric cancer burden and access to endoscopy, validated noninvasive testing, and effective eradication therapy differ markedly across healthcare systems [5–7]. The first Bangkok Consensus Report, published in 2018, established an ASEAN-specific framework for *H. pylori* management and highlighted the need for regional guidance that reflects these epidemiological and healthcare system differences [5]. Since then, new evidence has strengthened the rationale for eradication as a strategy for gastric cancer prevention, clarified the role of validated noninvasive testing, and shown an increasingly challenging antimicrobial resistance landscape, particularly for clarithromycin and fluoroquinolones [3, 8–10].

The Bangkok II Consensus Report was therefore convened to update regional recommendations for the prevention, diagnosis, treatment, and posttreatment management of *H. pylori* infection in ASEAN countries. This report integrates evidence from the updated global literature with regional data and expert interpretation relevant to Southeast Asia. The three working groups addressed (i) epidemiology, clinical impact, and indications for testing and treatment; (ii) diagnostic strategies and confirmation of eradication; and (iii) treatment regimens and posttreatment management. The aim of this manuscript is to provide a coherent, practice-oriented framework that can support clinicians, professional societies, and health systems across ASEAN while also informing future regional research and policy development [3, 5].

2 | Methodology of Consensus Process

The Bangkok II Consensus was organized by the ASEAN Stomach and Microbiota Study Group (ASMG). A multidisciplinary panel of gastroenterology experts from ASEAN countries, Japan, and Taiwan was convened to review and evaluate key clinical aspects of *H. pylori* infection and to develop evidence-based consensus statements for clinical practice in ASEAN countries (Figure 1). A structured literature review was conducted by each working group prior to the consensus meeting. Relevant studies were identified through searches of major electronic databases (including PubMed/MEDLINE and EMBASE) and key international and regional guideline documents, focusing on publications from 2018 (following the first Bangkok Consensus) to August 2026. Priority was given to randomized controlled trials, meta-analyses, systematic reviews, and high-quality observational studies. Additional region-specific data from Southeast Asia were incorporated where available, in line with previously published regional and international guidance [3, 5, 9]. This process was designed as a structured narrative review to support evidence synthesis and contextual interpretation for the region. Three working groups were established: Working Group 1 (WG1) addressed epidemiology, clinical impact, and indications for testing and treatment (Clinical Questions 1–8); Working Group 2 (WG2) addressed diagnostic testing and confirmation of eradication (Clinical Questions 9a–12); and Working Group 3 (WG3) addressed treatment regimens and posttreatment management (Clinical Questions 13–21). Each working group developed preliminary clinical questions and draft statements based on the available evidence. Voting was performed in a structured and anonymized manner to minimize potential bias. Final voting was conducted among panel members in a structured and anonymized manner to minimize potential bias. Two rounds of voting were performed. Consensus was defined a priori as agreement by $\geq 80\%$ of voting participants. Statements that did not reach the predefined threshold in the initial round were revised after panel discussion, with modification of wording for clarity and scope, and were then resubmitted for further voting. If disagreement persisted, the statement was either reformulated until consensus was achieved or not retained as a final recommendation. The quality of evidence and strength of recommendations were assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework (Table 1



FIGURE 1 | Expert panel of the Bangkok II Consensus on *Helicobacter pylori* Management in ASEAN countries.

TABLE 1 | Level of evidence and quality of evidence.

Level	Quality	Comments
I	High	Further research is very unlikely to change our confidence in the estimate of effect.
II	Moderate	Further research is likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
III	Low	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
IV	Very low	Any estimate of effect is very uncertain.

and Figure 2) [11]. Recommendations were formulated by integrating the quality of evidence with clinical relevance, regional applicability, resource availability, and feasibility across diverse healthcare settings in ASEAN countries. Strength of recommendation was assigned only to statements that explicitly recommended or suggested a clinical action. Descriptive, epidemiological, or evidence-synthesis statements were assigned a level of evidence but were not assigned a strength of recommendation and are reported as N/A.

All panel members were required to disclose potential conflicts of interest prior to participation. These disclosures were reviewed and managed according to standard academic practice to ensure transparency and minimize undue influence on the consensus process. Final statements and rationales were prepared by the working group secretaries and reviewed by the respective chairpersons, followed by harmonization across groups

to ensure consistency in wording and recommendations. All approved statements are summarized in this manuscript.

3 | Epidemiology, Clinical Impact, and Indications for Testing and Treatment of *H. pylori* in ASEAN Countries

3.1 | Working Group 1 (CQ 1–8)

3.1.1 | Clinical Question 1

Is *H. pylori* infection still prevalent in Southeast Asian countries, and what is its public health impact?

3.1.1.1 | Statement. *H. pylori* infection remains highly prevalent in certain Southeast Asian countries and constitutes a significant public health concern due to its strong association with gastric cancer, peptic ulcer disease, and its complications.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 81% Agree: 19%	Moderate	N/A

3.1.1.2 | Rationale. A global meta-analysis examining data from 1980 to 2022 demonstrated that the overall prevalence of *H. pylori* has been declining from approximately 52.6% before 1990 to 43.9% in adults in recent years [7]. Despite this global trend, *H. pylori* infection continues to be highly prevalent in certain populations within Southeast Asia. An expert survey conducted across nine Southeast Asian countries reported a wide variation in prevalence, ranging from 20% to 69%, with the highest rates observed in Myanmar, Laos, and Vietnam [6]. More recent data suggest that *H. pylori* infection remains a major public health

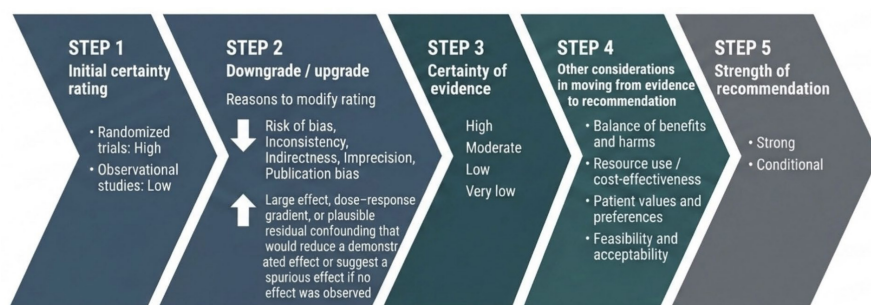


FIGURE 2 | GRADE process for rating evidence and recommendations.

concern in the region, with prevalence rates of 40.6% in Myanmar, 61.5% in the Philippines, and up to 87.7% among school-aged children in Vietnam [11–13]. *H. pylori* was designated a Group 1 carcinogen by the IARC in 1994, and a landmark global analysis estimated that approximately 76% of all gastric cancer cases worldwide are attributable to *H. pylori* infection [1, 2]. These data collectively affirm that *H. pylori* infection remains a major public health challenge in Southeast Asia, warranting sustained efforts in surveillance, prevention, and treatment.

3.1.2 | Clinical Question 2

In *H. pylori*-infected individuals, does eradication therapy reduce the risk of gastric cancer?

3.1.2.1 | Statement. In *H. pylori*-infected individuals, eradication therapy significantly lowers the long-term risk of gastric cancer, particularly when performed before the development of precancerous gastric conditions.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 100%	High	N/A

3.1.2.2 | Rationale. There is robust and consistent evidence supporting the benefit of *H. pylori* eradication in reducing gastric cancer risk [14, 15]. A 2016 meta-analysis reported a significant risk reduction of gastric cancer in asymptomatic individuals undergoing eradication (RR: 0.62; 95% CI: 0.49–0.79), and this finding was reaffirmed in an updated 2025 meta-analysis (RR: 0.64; 95% CI: 0.48–0.84) [10, 16]. The Taipei Global Consensus II (2025) further reinforces that *H. pylori* eradication is an effective prevention strategy for gastric cancer and should be offered to all infected adult individuals [3]. The protective effect of eradication appears to depend critically on the histological condition of the gastric mucosa at baseline. A large-scale randomized trial in China reported no cases of gastric cancer during 7.5 years of follow-up in individuals without intestinal metaplasia or dysplasia at the time of eradication, whereas new gastric cancers still developed among those with such baseline premalignant gastric conditions despite successful treatment [15]. After a mean follow-up of 26.5 years, this trial continued to show a significant risk reduction in the treatment group (HR: 0.57; 95% CI: 0.33–0.98) [17]. These findings highlight the importance of early *H. pylori*

detection and eradication—ideally before the onset of irreversible mucosal damage—to optimize gastric cancer prevention.

3.1.3 | Clinical Question 3

Does *H. pylori* eradication prevent peptic ulcer recurrence and ulcer-related bleeding?

3.1.3.1 | Statement. Eradication therapy reduces peptic ulcer recurrence and ulcer-related bleeding in *H. pylori*-infected patients, particularly those on long-term NSAID or aspirin therapy.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 88% Agree: 12%	High	N/A

3.1.3.2 | Rationale. Randomized trials and pooled analyses consistently demonstrate that eradication of *H. pylori* markedly lowers the risk of peptic ulcer recurrence and reduces subsequent ulcer-related bleeding among infected patients [18]. The Helicobacter Eradication Aspirin Trial (HEAT), a multicenter, double-blind, placebo-controlled trial, provided contemporary, high-quality evidence that targeted eradication in aspirin users lowers clinically important ulcer-related bleeding outcomes and emphasize that *H. pylori* eradication provides effective short-term protection against aspirin-associated peptic ulcer bleeding, supporting its role as a primary preventive strategy in high-risk patients [19]. It also recommended to test for and eradicate *H. pylori* in patients with active or prior peptic ulcer disease. *H. pylori* eradication strategy is favored in patients who will start or are receiving long-term NSAIDs or aspirin, which has additional long-term benefits such as reducing future ulcer disease and ulcer-related bleeding settings [20, 21].

3.1.4 | Clinical Question 4

Does *H. pylori* eradication improve symptoms in patients with functional dyspepsia?

3.1.4.1 | Statement. *H. pylori* eradication leads to symptom improvement in a subset of patients with functional dyspepsia,

with a modest but clinically relevant benefit that supports a test-and-treat approach in this population.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 25% Agree: 75%	Moderate	N/A

3.1.4.2 | Rationale. *H. pylori* eradication provides a modest but clinically relevant benefit in patients with functional dyspepsia. A recent systematic review and meta-analysis demonstrated that eradication therapy significantly reduced the persistence of dyspeptic symptoms compared with placebo or acid suppression, with numbers needed to treat (NNT) in the range of 10–15 over 6–12 months of follow-up [22, 23]. Regional data from Asia, including subgroup analyses, reveal heterogeneity in treatment response, with some studies showing attenuated or nonsignificant benefit. This variability may reflect differences in study design, population characteristics, background prevalence of *H. pylori*, and the multifactorial nature of dyspepsia [24, 25]. National guidelines including Malaysia, Indonesia, Thailand, Vietnam, and Myanmar guidelines similarly endorse *H. pylori* testing and eradication in patients with functional dyspepsia, while highlighting the need to consider local antibiotic resistance and patient preferences [26–30].

3.1.5 | Clinical Question 5

Is the test-and-treat approach appropriate for uninvestigated dyspepsia in Southeast Asian countries?

3.1.5.1 | Statement. The test-and-treat approach is effective and safe for uninvestigated dyspepsia in patients below the risk-stratified age threshold for endoscopy and without alarm features.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 69% Agree: 31%	Moderate	N/A

3.1.5.2 | Rationale. In Southeast Asia, expert guidelines and clinical trials strongly support a noninvasive test-and-treat approach for young patients with dyspepsia and no alarm features [26–29]. A randomized trial in young patients with dyspepsia found approximately 30%–35% *H. pylori* prevalence and concluded that the *H. pylori* test-and-treat approach effectively identifies and cures underlying ulcer disease while being more cost-effective than prompt endoscopy [31]. An important consideration is that the age threshold for risk stratification to decide on endoscopy differs substantially across countries in the region, depending on the background risk of gastric cancer in each population. In countries with a low incidence of gastric cancer, such as Indonesia or Thailand, the threshold age is usually 50 years [27, 29]. In contrast, Vietnam has the highest incidence of gastric cancer in the region, with a relatively high proportion of early-onset

gastric cancer, and the recommended age threshold to consider endoscopy is >35 years for women and >40 years for men [28, 32]. In summary, regional evidence and consensus emphasize that *H. pylori* test-and-treat approach in low-risk patients with dyspepsia delivers effective symptom relief and ulcer prevention at substantially lower cost, aligning with ASEAN guideline priorities for high-quality, economical care.

3.1.6 | Clinical Question 6

Does gastric cancer remain a major cause of cancer-related mortality in Southeast Asian countries?

3.1.6.1 | Statement. Gastric cancer remains a significant contributor to cancer burden and mortality in certain Southeast Asian countries, particularly due to delayed diagnosis and persistent *H. pylori* infection.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 88% Agree: 12%	Moderate	N/A

3.1.6.2 | Rationale. Across Southeast Asian countries, gastric cancer ranks among the top causes of cancer mortality. GLOBOCAN 2024 data reveal substantial burdens across the region: Vietnam reported approximately 12 373 new gastric cancer cases and 10 280 deaths; Myanmar documented 6 543 cases and 5 353 deaths; Thailand recorded 4 176 cases and 3 449 deaths; the Philippines reported 2 697 cases and 2 024 deaths; Malaysia had 2 170 cases and 1 773 deaths; Cambodia reported 784 cases and 653 deaths; and Laos had 172 cases and 129 deaths [4]. Crucially, no country in the region has implemented a national gastric cancer screening program, and much of the observed mortality reflects advanced-stage presentation and limited early detection [33]. A cross-sectional study in Vietnam found that *H. pylori* infection significantly increased the odds of gastric cancer (OR: 2.02; 95% CI: 1.4–3.0), and the presence of the *vacA m1* genotype further elevated the risk (OR: 2.7; 95% CI: 1.5–4.7) [34]. These findings reinforce the notion that chronic *H. pylori* infection—particularly strains carrying virulence factors—should be recognized as a principal contributing factor in gastric carcinogenesis in Southeast Asia.

3.1.7 | Clinical Question 7

Is community-based gastric cancer screening a feasible and effective strategy for early detection in Southeast Asian countries?

3.1.7.1 | Statement 7A. We do not suggest routine community-based screening of gastric cancer in Southeast Asian countries.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 76% Agree: 24%	High	Conditional

3.1.7.2 | Statement 7B. We recommend identifying high-risk individuals and offering targeted screening as an effective, context-appropriate strategy for early gastric cancer detection in Southeast Asian countries.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 83% Agree: 17%	High	Strong

3.1.7.3 | Rationale. Community-based gastric cancer screening has been implemented only in countries with high incidence of gastric cancer (age-standardized incidence rates [ASRs] ≥ 20 per 100 000 person-years), including Japan, Korea, and China [35]. A recent meta-analysis revealed a 40% risk reduction in gastric cancer mortality in high-ASR areas (relative risk: 0.60; 95% CI: 0.49–0.73) when using esophago-gastroduodenoscopy (EGD) as a screening tool [36]. Gastric cancer incidence varies substantially across ASEAN countries. Updated GLOBOCAN 2024 estimates demonstrate marked country-level variation in age-standardized gastric cancer incidence across the region (Table 2). This heterogeneity in disease burden supports a risk-adapted rather than uniform population-wide screening strategy across ASEAN countries [4].

In regions with low to intermediate gastric cancer incidence (ASR < 20 per 100 000), population-wide endoscopic screening is generally not considered cost-effective, which consistently demonstrates that the benefit of screening is strongly dependent on underlying disease burden. Therefore, targeted gastric screening for at-risk individuals should be suggested in intermediate-to-low-risk gastric cancer areas, including Southeast Asian countries. The strategy for identifying high-risk patients should be based on local data regarding risk factors and cost-effectiveness in each country [37, 38]. Given this marked country-level variation, targeted screening strategies should be adapted to local gastric cancer incidence, population risk factors, healthcare resources, and cost-effectiveness rather than applied uniformly across ASEAN countries.

3.1.8 | Clinical Question 8

Should patients with gastric preneoplastic conditions and lesions be tested and treated for *H. pylori* and stratified for gastric cancer risk?

3.1.8.1 | Statement. We suggest that patients with gastric preneoplastic conditions and lesions should be tested and treated for *H. pylori*, and stratified for gastric cancer risk.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 72% Agree: 28%	High	Conditional

3.1.8.2 | Rationale. Patients with *H. pylori* infection and severe gastric atrophy or gastric intestinal metaplasia (GIM) are at increased risk of gastric cancer [39, 40]. The recent guidelines from the United Kingdom and Europe on the diagnosis and management of patients with precancerous gastric lesions recommend testing and treating *H. pylori* infection in all patients with chronic atrophic gastritis, GIM, and dysplasia. Furthermore, systematic EGD with image-enhanced endoscopy (IEE) and targeted biopsy should be performed to evaluate the extension of gastric atrophy and GIM [41, 42]. The American Gastroenterological Association (AGA) strongly recommended testing for *H. pylori* followed by eradication in patients with GIM [43]. According to data from Thailand, only those with incomplete-type GIM developed gastric cancer at 5-year follow-up, and the extensive pattern of GIM exhibited a 12.2-fold (95% CI: 2.0–72.9) increased risk of gastric cancer [44].

4 | Diagnostic Tests for *H. pylori* Infection

4.1 | Working Group 2 (CQ 9–12)

4.1.1 | Clinical Question 9a

How should diagnostic tests for *H. pylori* infection be guided in Southeast Asian countries?

4.1.1.1 | Statement. We recommend that diagnostic tests should be selected based on clinical indication, cost, availability, and local validation.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 94% Agree: 6%	Moderate	Strong

4.1.1.2 | Rationale. The selection of an appropriate diagnostic test for *H. pylori* infection is a critical clinical decision that must be individualized according to the clinical context, available resources, and local epidemiological conditions. Among noninvasive tests, The ¹³C urea breath test (UBT) is widely regarded as a highly accurate noninvasive test for detection of active *H. pylori* infection [5, 9, 45]. A meta-analysis evaluating the diagnostic accuracy of the ¹³C-UBT specifically in Asian populations confirmed its high sensitivity and specificity, supporting its use as a reliable and safe noninvasive test for *H. pylori* detection in this region [45]. In the Asia-Pacific region, the UBT was the most commonly used diagnostic method, reported by 72.4% of clinicians surveyed [46]. The stool antigen test (SAT), particularly the monoclonal antibody-based assay, is a cost-effective and noninvasive alternative to the UBT, with sensitivity and specificity generally exceeding 90% when performed under appropriate conditions [47]. Serology offers the advantage of simplicity and low cost, but is unable to distinguish between active and past infection. Studies comparing the performance of commercially available serological kits in Asian populations have demonstrated significantly lower

TABLE 2 | Estimated age-standardized incidence rates of gastric cancer in ASEAN countries according to GLOBOCAN 2024 [4].

Country	Gastric cancer ASR (world), per 100000
Myanmar	10.9
Vietnam	9.8
Brunei Darussalam	6.0
Singapore	5.9
Malaysia	5.5
Cambodia	4.9
Thailand	3.2
Philippines	2.8
Lao PDR	2.8
Timor-Leste	2.1
Indonesia	1.3

Source: GLOBOCAN 2024 [4].

Note: ASR, age-standardized incidence rate using the World Standard Population. Estimates are for both sexes and all ages.

antibody titers and variable sensitivity and specificity, highlighting the critical need for local validation before clinical use in South-east Asia [48, 49]. Invasive tests, including the rapid urease test (RUT), histopathological examination, and culture, require upper gastrointestinal endoscopy and are appropriate when endoscopy is clinically indicated. Given the heterogeneity of healthcare systems and resources across Southeast Asian countries, clinicians should select diagnostic tests based on (i) the clinical indication; (ii) cost and local availability; (iii) whether the test has been locally validated; and (iv) the need to adhere to appropriate pretest medication washout periods [5, 9].

4.1.2 | Clinical Question 9b

Which test is suggested for population-based screening for *H. pylori* infection?

4.1.2.1 | Statement. We suggest that locally validated serology is suitable for population screening in certain Southeast Asian countries but requires a confirmatory test for active infection before treatment.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 72% Agree: 28%	Moderate	Conditional

4.1.2.2 | Rationale. Population-based screening for *H. pylori* infection has gained increasing recognition as an effective and cost-efficient strategy for primary prevention of gastric cancer, particularly in regions with high infection prevalence and elevated gastric cancer burden such as Southeast Asia [14]. Serology (IgG antibody testing) has historically been advocated as the most

cost-effective option for population-based *H. pylori* screening, particularly in high-prevalence settings, owing to its simplicity, low cost, and the absence of requirements for pretest medication withdrawal [26]. Rapid urine antibody also had sensitivity and specificity of 86.2% and 90.8% for *H. pylori* detection [50]. The first Bangkok ASEAN Consensus Report similarly endorsed serology as the most cost-effective test for population-based screening in high-prevalence settings [5]. However, a critical limitation of serology is its inability to distinguish between active and past infection, as IgG antibodies may persist for months to years after successful eradication. This characteristic makes serology unsuitable as a standalone test for clinical decision-making regarding treatment initiation, and a confirmatory test for active infection—such as the UBT or monoclonal SAT—is therefore required before commencing eradication therapy [9, 51]. The importance of local validation of serological kits in Southeast Asian populations cannot be overstated, as commercial serological kits were predominantly developed and validated in Western populations, and Asian populations exhibit lower *H. pylori* antibody titers compared to European populations [48].

4.1.3 | Clinical Question 10

How should PPIs, PCABs, antibiotics, and bismuth be managed before testing?

4.1.3.1 | Statement. We recommend discontinuing PPIs and PCABs for ≥ 2 weeks and antibiotics/bismuth for ≥ 4 weeks depending on the test used to avoid false-negative results.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 89% Agree: 11%	High	Strong

4.1.3.2 | Rationale. The accurate diagnosis of *H. pylori* infection is critically dependent on the conditions under which diagnostic tests are performed. Several commonly used medications—including proton pump inhibitors (PPIs), potassium-competitive acid blockers (PCABs), antibiotics, and bismuth-containing compounds—can significantly suppress *H. pylori* bacterial density or alter the gastric environment in ways that produce false-negative results, particularly with noninvasive tests such as the UBT and SAT. PPIs and PCABs exert bacteriostatic effects on *H. pylori* and raise intragastric pH, which reduces bacterial density and metabolic activity. Studies have demonstrated that PPI use within 2 weeks of testing is associated with a substantial rate of false-negative UBT results, with up to 43% of patients on PPIs yielding false-negative breath tests [52–55].

Antibiotics and bismuth compounds directly suppress or eliminate *H. pylori*, and their effects can persist for several weeks after cessation. A minimum washout period of 4 weeks after stopping antibiotics or bismuth is required to allow bacterial density to recover to detectable levels [56].

Serology and rapid urine test remain the tests that are not significantly affected by recent PPI, antibiotic, or bismuth use, as

it detects IgG antibodies rather than active bacterial presence. However, its inability to distinguish active from past infection limits its utility in clinical diagnosis [57, 58].

In clinical practice, patients should be counselled to discontinue PPIs and PCABs for at least 2 weeks and antibiotics and bismuth for at least 4 weeks before undergoing UBT or SAT testing, to minimize the risk of false-negative results and ensure accurate clinical decision-making.

4.1.4 | Clinical Question 11

What are the optimal tests and timing for confirming *H. pylori* eradication?

4.1.4.1 | Statement. We recommend the UBT as the optimal test for confirming *H. pylori* eradication, performed at least 4 weeks after completion of eradication therapy, with prior discontinuation of PPIs/PCABs for ≥ 2 weeks.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 83% Agree: 17%	High	Strong

4.1.4.2 | Rationale. Confirmation of *H. pylori* eradication following treatment is an essential component of clinical management, as it identifies treatment failure and guides subsequent therapeutic decisions. The UBT is the preferred noninvasive test for confirming eradication, owing to its high sensitivity and specificity for detecting active infection, its noninvasive nature, and its independence from the need for endoscopy [45, 51]. A systematic review and meta-analysis of posttreatment UBT performance confirmed its high accuracy for confirming eradication, with sensitivity and specificity consistently exceeding 90% when performed under appropriate conditions [59]. The monoclonal SAT is an acceptable alternative to the UBT for confirming eradication, with comparable sensitivity and specificity when performed using validated monoclonal antibody-based kits [51, 60]. The optimal timing for posttreatment testing is at least 4 weeks after completion of eradication therapy, as earlier testing may yield false-negative results due to residual suppression of bacterial density by antibiotics and acid-suppressive agents [5, 9]. Rebamipide has minimal impact on *H. pylori* confirmatory test results. It may be safely used during the PPIs/PCABs washout period as a bridge therapy without increasing the risk of false-negative outcomes [61, 62]. In the Asia-Pacific region, the UBT was the most commonly used test for confirming eradication, reported by 72.4% of clinicians surveyed [46]. In settings where UBT is not available, the monoclonal SAT represents a practical and cost-effective alternative for confirming eradication [60].

4.1.5 | Clinical Question 12

Should a test-and-treat strategy for *H. pylori* infection in dyspeptic patients be reimbursed?

4.1.5.1 | Statement. We recommend that healthcare systems in Southeast Asian countries should consider reimbursement of the test-and-treat strategy for *H. pylori* infection in dyspeptic patients, given its cost-effectiveness and long-term benefits in gastric cancer prevention.

Strongly agree: 78% Agree: 22%	Moderate	Strong
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4.1.5.2 | Rationale. The test-and-treat strategy for *H. pylori* infection in dyspeptic patients has been demonstrated to be cost-effective in multiple economic analyses across diverse healthcare settings, including Asian populations. Previous studies confirmed that population *H. pylori* screening and treatment are feasible and cost-effective that remains the most effective and resource-appropriate strategy for reducing this burden globally [31, 63]. Studies in Taiwan showed the cost-effectiveness of *H. pylori* test-and-treat programs in preventing gastric cancer, referring to the nationwide reimbursement database [64, 65]. Reimbursement of the test-and-treat strategy would improve access to *H. pylori* testing and treatment, particularly in resource-limited settings, and would support the implementation of evidence-based *H. pylori* management guidelines across the diverse healthcare systems of ASEAN countries.

5 | Treatment Regimens and Post Treatment Management of *H. pylori* Infection in ASEAN Countries

5.1 | Working Group 3 (CQ 13–21)

See Figure 3.

5.1.1 | Clinical Question 13

Is antibiotic resistance worsening in Southeast Asian countries?

5.1.1.1 | Statement. Resistance to metronidazole is high, whereas clarithromycin and levofloxacin resistance is rising. Tetracycline and amoxicillin resistance remain low.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 79% Agree: 21%	High	N/A

5.1.1.2 | Rationale. Available surveillance and clinical data across ASEAN countries demonstrate a consistent regional pattern of *H. pylori* antimicrobial resistance characterized by persistently high metronidazole resistance, progressively increasing resistance to clarithromycin and fluoroquinolones, and generally low resistance to tetracycline and amoxicillin

[8, 66–68]. In the most recent period analyzed, pooled primary resistance in the Asia-Pacific region reached 30% for clarithromycin, 61% for metronidazole, and 35% for levofloxacin, compared with 4% for tetracycline and 6% for amoxicillin. Within Southeast Asia, metronidazole resistance appears to be the most consistently high-resistance phenotype, but even here, the exact prevalence varies widely by country, sampling frame, and testing method [66]. Metronidazole resistance is reported at high levels throughout the region, ranging from approximately 30% to 43.2% in Thailand, from 70% to 76% in Vietnam, around 80% in Myanmar, about 48.1% in Singapore, and ranging from 78.6% to 96.4% in Cambodia, indicating limited reliability of metronidazole-containing regimens when used empirically [8, 50, 68–76]. The evidence for increasing clarithromycin and fluoroquinolone resistance is stronger in some countries than in others. Clarithromycin resistance has risen to clinically prohibitive levels in several settings, including approximately 33% in early Vietnamese multicenter cohorts and exceeding 70% in parts of Vietnam, with substantial regional variability also observed in Thailand [8, 68, 69, 75, 76]. Fluoroquinolone resistance similarly shows a rising and often substantial burden, particularly among treatment-experienced populations, with levofloxacin resistance reported at up to 67.3% in Cambodia, 18%–41% across Vietnamese cohorts, and up to 27% in Thai studies [50, 68, 69, 71, 73, 77]. At the pooled Asia-Pacific level, primary amoxicillin resistance remains much lower than for clarithromycin, metronidazole, or levofloxacin, and several Southeast Asian studies still report very low or absent resistance [66]. In contrast, tetracycline resistance remains consistently low across most Southeast Asian datasets, frequently reported as near-zero, supporting its role as a preserved-activity agent in the region [8, 75].

In addition to single-drug resistance, dual and multidrug resistance patterns have emerged as important determinants of *H. pylori* eradication failure in Southeast Asia. Of particular concern is dual resistance involving clarithromycin, which may compromise both first-line and commonly used salvage regimens [75]. Across reported Southeast Asian reports, clarithromycin–metronidazole dual resistance appears to range from about 4.4% to 24.3%, whereas clarithromycin–fluoroquinolone dual resistance ranges from about 30.7% to 48.2%, with the highest published signals coming from Vietnam [8, 50, 69, 72, 76]. For multidrug resistance (≥ 2 antibiotic classes), the directly verifiable cohort-level range is broad: about 4.2% to 21.8% in Thailand, 50.7% to 78.9% in Vietnamese primary/secondary isolates, and 57.1% to 76.4% in Cambodian datasets, whereas Singapore appears lower, with reported dual/triple resistance up to 7.5% depending on the cohort and definition used [50, 68, 71, 78, 79]. These findings suggest a decline in the effectiveness of empiric fluoroquinolone-based regimens across the region, supporting the use of more resistance-resilient strategies, particularly bismuth-containing therapies.

5.1.2 | Clinical Question 14

What is the most effective and appropriate first-line regimen for *H. pylori* eradication in Southeast Asian countries?

5.1.2.1 | Statement. In regions with high clarithromycin resistance, a 14-day bismuth-based quadruple regimen is suggested as the first-line therapy. Where bismuth is unavailable,

a locally validated regimen should be considered for first-line treatment. PCABs-based therapy may also be considered where resources permit.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 74% Agree: 26%	High	Conditional

5.1.2.2 | Rationale. First-line *H. pylori* therapy in Southeast Asia should avoid antibiotics with high regional resistance, particularly clarithromycin and levofloxacin. Given the widespread clarithromycin resistance in this region, clarithromycin-based triple therapy no longer achieves acceptable eradication rates and should not be used empirically [3, 9, 80]. Contemporary international guidelines are aligned that, when antibiotic susceptibility testing is unavailable and local clarithromycin resistance is high or unknown, 14-day bismuth quadruple therapy comprising a PPI, bismuth, tetracycline, and metronidazole is the preferred first-line treatment, as its efficacy is largely unaffected by clarithromycin or levofloxacin resistance [3, 9, 81, 82]. Comparative studies show bismuth quadruple therapy to be superior to triple therapy and at least comparable to concomitant, sequential, and hybrid regimens [83–88]. Nonbismuth concomitant therapy (PPI + amoxicillin + clarithromycin + metronidazole) is also an accepted first-line option in some guidelines, particularly where bismuth is unavailable or difficult to access; however, because it still contains clarithromycin, its effectiveness may be more vulnerable than bismuth quadruple therapy in areas with high clarithromycin or dual resistance, which is an important concern in Southeast Asia [9, 89]. In summary, empirical 14-day bismuth quadruple therapy remains the treatment of choice in Southeast Asia, with vonoprazan-based regimens as promising alternatives where available; therapy should be individualized using susceptibility data whenever feasible.

PCABs-based regimens are increasingly recognized as important options in Southeast Asia. Regional guidance from Malaysia already includes vonoprazan-based dual or triple therapy as potential first-line options, reflecting growing acceptance of PCABs-based regimens within ASEAN practice [26]. Among PCABs-based regimens, the most robust and consistent evidence currently supports PCABs plus high-dose amoxicillin dual therapy [90–92]. Its principal advantage in high-resistance settings is that it avoids clarithromycin exposure and therefore circumvents one of the major drivers of empirical treatment failure in the region. In parallel, randomized data further support the use of 14-day vonoprazan-based bismuth quadruple therapy, which achieved eradication rates of 94.0% overall and 100% in clarithromycin-resistant isolates, highlighting the benefit of combining potent acid suppression with a resistance-resilient regimen [93]. By contrast, vonoprazan-based triple therapy remains susceptible to clarithromycin resistance and is therefore less suitable as an empirical strategy in areas with high macrolide resistance [94]. Emerging data on tegoprazan-based regimens further expand the PCABs landscape, with dual, sequential, and quadruple approaches reporting eradication rates of approximately 84%–91% and favorable safety profiles [90, 95, 96]. Overall, current evidence supports

PCABs-based regimens particularly vonoprazan–amoxicillin dual therapy as robust alternatives to conventional treatment, with tegoprazan-based strategies offering additional regional options.

5.1.3 | Clinical Question 15

What are the recommended second-line regimens for *H. pylori* eradication in Southeast Asian countries?

5.1.3.1 | Statement. Second-line therapy for *H. pylori* should be chosen according to the previously used regimen and local antibiotic resistance patterns. Recommended options include bismuth or nonbismuth quadruple therapy, 14-day PCABs-based therapy, or susceptibility-guided therapy where available.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 84% Agree: 16%	Moderate	Strong

5.1.3.2 | Rationale. Second-line therapy for *H. pylori* infection should be selected according to the previously used regimen and local antibiotic resistance patterns. Current guidelines are aligned that previously used regimens should not be repeated indiscriminately, and that the history of exposure to

clarithromycin and levofloxacin therapies should directly shape rescue-treatment selection [9, 26, 82].

In Southeast Asia, where clarithromycin resistance is high and fluoroquinolone resistance is increasing, reuse of macrolide- or quinolone-containing regimens without susceptibility confirmation should be avoided [3, 75]. Bismuth quadruple therapy remains the preferred empiric second-line regimen in patients who have not previously received it, owing to its reproducible eradication rates across diverse resistance settings and its independence from clarithromycin and fluoroquinolone resistance [97–101]. Nonbismuth quadruple therapy or fluoroquinolone-containing regimens may be considered when local susceptibility patterns support their use [102, 103]. PCABs-based therapy may be considered an alternative second-line option, particularly in amoxicillin-based regimens, given the persistently low prevalence of amoxicillin resistance and the enhanced bactericidal activity achieved under sustained intragastric pH control [104–106]. Among PCABs-based options, vonoprazan-based dual regimens have demonstrated promising, though somewhat variable, efficacy in rescue settings. Recent randomized trials reported eradication rates of approximately 90% with vonoprazan plus high-dose amoxicillin and 91.1% with vonoprazan–tetracycline dual therapy [106, 107].

Furthermore, a meta-analysis showed that vonoprazan-based rescue regimens were associated with superior eradication rates compared with PPI-based therapy, while not significantly increasing adverse events. Within this evidence base, vonoprazan–amoxicillin dual therapy generally achieved eradication rates of

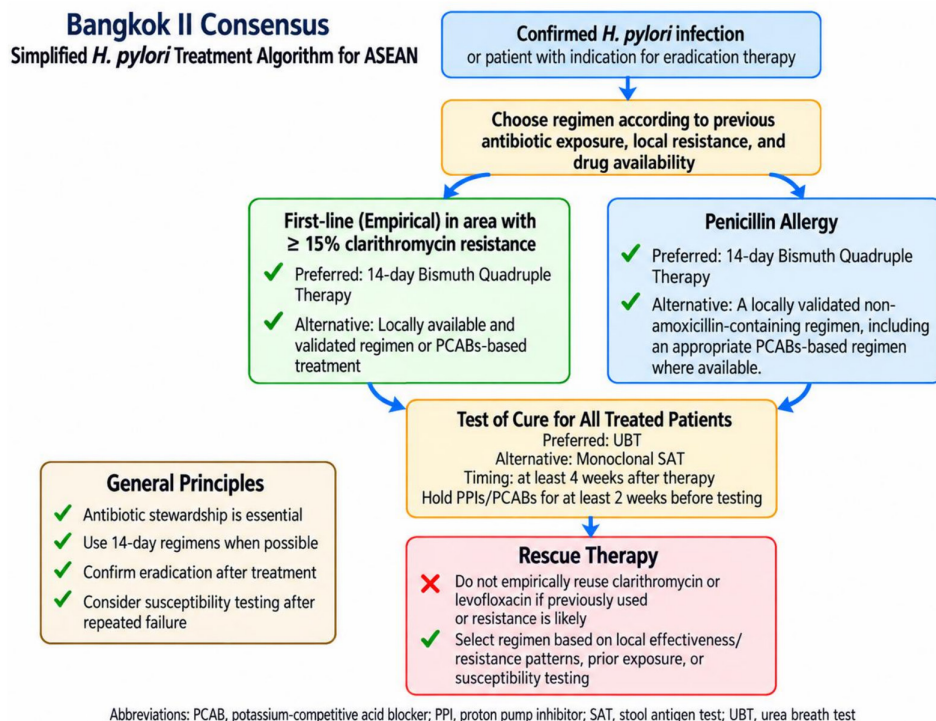


FIGURE 3 | Simplified clinical algorithm for *Helicobacter pylori* Management in ASEAN countries (Bangkok II Consensus). Regimen selection should be individualized according to local antimicrobial resistance patterns, prior antibiotic exposure, availability of bismuth and P-CABs, and locally validated treatment efficacy. Routine testing for *H. pylori* virulence factors was not incorporated into the treatment algorithm because it is not widely available across ASEAN and currently has a limited role in routine regimen selection.

approximately 80%–90%. However, as most available data derive from Japanese populations, their generalizability to ASEAN countries remains uncertain [108]. Where available, susceptibility-guided therapy is encouraged to optimize eradication rates while minimizing unnecessary antibiotic exposure [75].

5.1.4 | Clinical Question 16

When should antibiotic susceptibility testing be considered?

5.1.4.1 | Statement. Antibiotic susceptibility testing is recommended for patients who have failed at least two eradication regimens. It may also be considered prior to initiating therapy in settings where reliable culture or molecular testing is available.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 74% Agree: 26%	Moderate	Conditional

5.1.4.2 | Rationale. Antibiotic susceptibility testing should be considered primarily in treatment-experienced patients, particularly after at least two eradication failures, to avoid reuse of ineffective antibiotics and to guide selection of subsequent regimens. This is particularly important after repeated treatment failure, when the likelihood of resistance to previously used agents increases and empiric retreatment becomes progressively less reliable.

While empiric therapies such as optimized bismuth quadruple therapy remain appropriate when susceptibility data are unavailable, susceptibility-guided treatment becomes more relevant in patients with persistent *H. pylori* infection, particularly before the use of clarithromycin- or levofloxacin-containing regimens [3, 9, 82]. In Asian settings, particularly those with high resistance to clarithromycin and levofloxacin, susceptibility-guided therapy is especially valuable for selecting rescue treatment, most notably in patients with more than two prior eradication failures, in line with recommendations from multiple guidelines [3, 9, 82]. A stewardship-oriented approach involving routine susceptibility testing using molecular or culture-based methods is reasonable in principle, even prior to first-line therapy; however, its generalized implementation is limited by availability and feasibility, and data remain scarce [109–111]. Antibiotic susceptibility testing should be positioned as a targeted tool rather than a universal requirement, with greatest clinical utility in patients with repeated eradication failures, in guiding the reuse of resistance-prone antibiotics.

5.1.5 | Clinical Question 17

What are the recommended treatment options for *H. pylori* eradication in patients with confirmed penicillin allergy in Southeast Asian countries?

5.1.5.1 | Statement. For patients with penicillin allergy, bismuth-based quadruple therapy for 14 days is recommended

as the first-line regimen. In settings where bismuth is not available, alternative options should be selected according to local resistance patterns and patient tolerance. PCABs-based regimens may be considered.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 89% Agree: 11%	Moderate	Strong

5.1.5.2 | Rationale. In patients with confirmed penicillin allergy, treatment options are limited by the inability to use amoxicillin, requiring reliance on regimens with low cross-resistance and proven efficacy in high-resistance settings. However, many self-reported penicillin allergy labels do not reflect true clinically relevant hypersensitivity, so reassessment is appropriate when the history is unclear or not suggestive of an immediate reaction [112, 113]. This is particularly relevant in *H. pylori* management, where unnecessary exclusion of amoxicillin narrows treatment options and may increase reliance on alternatives that are less tolerable or more vulnerable to resistance. Accordingly, recommendations for penicillin-allergic patients are most applicable to those with genuine or well-established allergy [112, 114–116]. Bismuth-based quadruple therapy for 14 days is therefore favored as first-line treatment, as it avoids beta-lactams and macrolides while providing reproducible eradication rates across diverse resistance profiles, a consideration of particular importance in Southeast Asia where clarithromycin resistance is prevalent [3, 9, 82]. PCABs-based regimens may be considered as an alternative strategy, given their ability to achieve more potent and sustained gastric acid suppression than conventional PPIs, thereby enhancing antibiotic activity and potentially improving eradication outcomes, especially in salvage scenarios [117]. Among PCABs-based alternatives, vonoprazan-tetracycline dual therapy has recently emerged as a promising option. In a randomized trial, this regimen was non-inferior to classical bismuth quadruple therapy as first-line treatment in penicillin-allergic patients, with an eradication rate of 92.0% (95% CI, 86.1%–95.6%), fewer adverse events, and better adherence [118]. In contrast, although vonoprazan-clarithromycin-metronidazole is the best described PCABs-based triple regimen and has reported high eradication rates, its empirical use remains limited by clarithromycin resistance [119]. Overall, management in penicillin-allergic patients should prioritize avoidance of antibiotics with a high likelihood of resistance, adequate treatment duration, potent acid suppression, and confirmation of eradication, while reserving susceptibility-guided approaches for refractory infection or settings with established testing infrastructure.

5.1.6 | Clinical Question 18

What is the clinical role of PCABs in the treatment of *H. pylori* infection in Southeast Asian countries?

5.1.6.1 | Statement. PCABs-based regimens can be used as a rescue therapy for *H. pylori* infection, where available.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 63% Agree: 37%	Moderate	Conditional

5.1.6.2 | Rationale. PCABs-based regimens may be used as rescue therapy for *H. pylori* infection, where available, particularly in treatment-experienced patients or in settings with high background antibiotic resistance. This rationale applies to both vonoprazan and tegoprazan, as both agents provide potent and sustained acid suppression, thereby enhancing antibiotic activity and improving eradication outcomes in patients who have failed prior PPI-based regimens [120].

Given the high burden of clarithromycin resistance across parts of Southeast Asia, PCABs-based strategies may expand salvage treatment options, particularly where conventional regimens are less suitable, but current evidence does not justify treating them as replacements for bismuth quadruple therapy [80, 106–108, 121]. Previous studies of *H. pylori* treatment interventions in East Asia confirmed that PCABs-based regimens, particularly vonoprazan–amoxicillin dual therapy, achieved high eradication rates and demonstrated favorable tolerability profiles compared with conventional PPI-based regimens [91, 120]. In addition, PCABs-based regimens may also be considered as first-line therapy in selected settings due to their superior acid suppression compared with conventional PPIs and the associated improvements in eradication efficacy [90, 92, 95, 96, 117]. Collectively, PCABs are best positioned within a flexible treatment framework that supports their use both as an alternative first-line option, where guided by local practice and availability, and as part of salvage strategies following prior treatment failure.

5.1.7 | Clinical Question 19

What are the recommended empirical rescue therapy options for *H. pylori* eradication when antibiotic susceptibility testing is not available in Southeast Asian countries?

5.1.7.1 | Statement. Empirical rescue therapy for *H. pylori* should be guided by the patient's prior antibiotic exposure, local resistance patterns, and drug availability.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 84% Agree: 16%	Moderate	Strong

5.1.7.2 | Rationale. In ASEAN countries, empirical rescue therapy for *H. pylori* infection is often necessary because routine antibiotic susceptibility testing is not consistently available, whereas resistance to key antibiotics, particularly clarithromycin and increasingly fluoroquinolones, remains common. In this setting, the choice of rescue regimen should not rely on a single

preferred regimen for all patients, but should instead be individualized according to three main considerations: prior antibiotic exposure, local resistance patterns, and drug availability [3, 9, 75, 82, 109, 122].

Previously administered antibiotics, particularly macrolides and fluoroquinolones, should generally be avoided because their reuse is associated with reduced eradication success [75, 109, 122]. Fourteen-day optimized bismuth quadruple therapy remains the preferred empirical option when it has not been used previously [123]. After the failure of optimized BQT, subsequent therapy should be individualized according to prior antibiotic exposure, local resistance patterns, and available treatment options. Among PPI-based regimens, PPI–amoxicillin–sitafloxacin triple therapy has some supporting evidence, derived mainly from Japanese studies, with reported eradication rates ranging from 56.5% to 90.9%, although its empirical use should take local fluoroquinolone resistance patterns into careful consideration [124–126]. However, meta-analytic data suggest that vonoprazan-based sitafloxacin regimens achieve higher eradication rates, generally in the range of 83.3%–93.0% [126–129]. However, a recent prospective study of 7-day vonoprazan–amoxicillin–sitafloxacin triple therapy used as salvage treatment showed more modest efficacy, with eradication rates of 70.0%, despite very high background genotypic resistance to levofloxacin and clarithromycin, underscoring the importance of local resistance patterns when considering quinolone-containing rescue regimens [130]. In settings with high fluoroquinolone resistance, high-dose amoxicillin–PCABs-based dual therapy may also be favored over empirical reuse of quinolone-based regimens [106]. In this context, empirical rescue therapy is best framed as a resistance-aware, stepwise approach that prioritizes avoidance of antibiotic reuse, especially levofloxacin and clarithromycin, adequate treatment duration (14 days), and potent acid suppression.

5.1.8 | Clinical Question 20

Should confirmation of *H. pylori* eradication be performed after treatment?

5.1.8.1 | Statement. Posttreatment confirmation of *H. pylori* eradication is recommended to ensure therapeutic success.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 89% Agree: 11%	High	Strong

5.1.8.2 | Rationale. Posttreatment confirmation of *H. pylori* eradication is essential to ensure therapeutic success and to identify persistent infection that requires further management. Routine test-of-cure is emphasized because eradication rates are increasingly unpredictable in the context of rising antimicrobial resistance, and clinical response alone is an unreliable surrogate for microbiological cure [131]. Failure to confirm eradication risks ongoing mucosal inflammation, continued risk of peptic

ulcer recurrence and gastric cancer, and unrecognized treatment failure that may promote further resistance through repeated empiric antibiotic exposure [109, 132, 133]. Accordingly, noninvasive testing using UBT or SAT is recommended at least 4 weeks after completion of eradication therapy, with prior discontinuation of antibiotics and bismuth for a minimum of 4 weeks and PPIs/PCABs for at least 2 weeks to minimize false-negative results [53, 54, 56, 134, 135]. In Southeast Asia, where background resistance is high and empiric regimens are commonly used, systematic confirmation of eradication is particularly important to guide timely selection of rescue therapy, support antimicrobial stewardship, and optimize long-term clinical outcomes.

5.1.9 | Clinical Question 21

What is the rate of *H. pylori* reinfection after successful eradication in Southeast Asian countries?

5.1.9.1 | Statement. In Southeast Asian countries, the annual reinfection rate of *H. pylori* after successful eradication remains low.

Level of agreement	Level of evidence	Strength of recommendation
Strongly agree: 78%	Moderate	N/A
Agree: 22%		

5.1.9.2 | Rationale. In ASEAN countries, true reinfection after successful *H. pylori* eradication appears relatively uncommon at the individual level, although overall recurrence rates remain higher than in high-income settings. In the post-eradication literature, recurrence refers broadly to renewed positivity after initially successful treatment, whereas true reinfection implies acquisition of a new infection and recrudescence reflects re-emergence of the original strain after incomplete eradication. This distinction is clinically important because posttreatment recurrence may reflect either persistence of the original strain or acquisition of a new infection [136–138]. Supporting this, a prior study in ASEAN country reported low reinfection rates after successful eradication, with 1- and 2-year reinfection rates of 5.1% and 6.1%, respectively, corresponding to an annual reinfection rate of 2.9%, with no clear difference between urban and rural settings [139]. In the global systematic review and meta-analysis, the annual reinfection was 3.1%, with higher rates observed in developing than in developed settings [140]. Importantly, most early posttreatment positivity represents recrudescence due to incomplete initial eradication rather than true reinfection, underscoring the need for routine test-of-cure and optimization of first-line and rescue regimens [141, 142]. Over longer follow-up, however, genuine reinfection becomes increasingly relevant in Southeast Asian populations, where background prevalence remains high [143]. These epidemiologic features support guideline emphasis on achieving high primary eradication rates, confirming cure after therapy, and adopting resistance-aware treatment strategies, whereas recognizing that reinfection pressure persists at the population level despite relatively low individual annual risk.

6 | Discussion

The Bangkok II Consensus Report provides an updated regional framework for *H. pylori* management in ASEAN and extends the scope of the first Bangkok Consensus by incorporating new evidence on gastric cancer prevention, diagnostic accuracy, antimicrobial resistance, and emerging eradication regimens. Across the 21 clinical questions addressed by the three working groups, a consistent message emerges: *H. pylori* management in Southeast Asia must be evidence-based, region-sensitive, and pragmatic, considering major differences in disease burden, healthcare access, and resource availability across ASEAN countries.

A major theme of this consensus is the need to respond decisively to the regional antimicrobial resistance profile. Clarithromycin resistance is now sufficiently high in many Southeast Asian settings to undermine empirical clarithromycin-based triple therapy, whereas fluoroquinolone resistance is also increasing and metronidazole resistance remains common [8, 66]. These data support 14-day bismuth quadruple therapy as the most robust empirical first-line regimen in much of the region, while also supporting the role of PCAB-based regimens as effective alternatives or rescue options where available [3, 9, 81–88]. The recommendations from Working Group 2 underscore that diagnostic accuracy is fundamental to effective *H. pylori* management. Although the UBT and validated monoclonal SAT remain the preferred noninvasive approaches for active infection and test-of-cure, their performance depends on appropriate medication washout and local implementation [5, 9, 26, 45, 50, 51]. In addition, the consensus recognizes that validated serology may still have a role in population-level strategies in selected settings, provided that a confirmatory test for active infection is used before treatment is started [26, 48, 49]. The epidemiological and clinical considerations summarized by Working Group 1 reaffirm that *H. pylori* remains a substantial public health issue in ASEAN. The burden is expressed not only through infection prevalence but also through downstream consequences including peptic ulcer disease, dyspepsia, premalignant gastric lesions, and gastric cancer [16, 24, 133, 144]. Importantly, the evidence now more strongly supports eradication before advanced premalignant change develops, thereby reinforcing the value of timely diagnosis and treatment as part of regional cancer prevention policy [3, 15, 63, 64]. The clinical questions and corresponding consensus statements are presented in Table 3, and a simplified treatment algorithm is shown in Figure 3.

Several limitations of this consensus should be acknowledged. Some recommendations necessarily rely on evidence generated outside ASEAN, particularly from East Asia and Western populations, because high-quality country-specific data remain limited for several clinical questions. In addition, healthcare infrastructure, reimbursement systems, access to endoscopy, availability of bismuth and PCABs, and resistance surveillance capacity vary substantially across the region. Accordingly, implementation should be adapted to national and local contexts while preserving the underlying principles of evidence-based care and antimicrobial stewardship.

TABLE 3 | Summary of consensus statements, level of agreement, level of evidence, strength of recommendation, and supporting references from the Bangkok II Consensus Report.

CQ	Statement	Level of agreement	Level of evidence	Strength of recommendation	Supporting references
1	Is <i>H. pylori</i> infection still prevalent in Southeast Asian Countries, and what is its public health impact? <i>H. pylori</i> infection remains highly prevalent in certain Southeast Asian countries and constitutes a significant public health concern due to its strong association with gastric cancer, peptic ulcer disease, and its complications.	Strongly agree: 81%; agree: 19%	Moderate	N/A	1, 2, 6, 7, 11–13
2	In <i>H. pylori</i> -infected individuals, does eradication therapy reduce the risk of gastric cancer? In <i>H. pylori</i> -infected individuals, eradication therapy significantly lowers the long-term risk of gastric cancer, particularly when performed before the development of precancerous gastric conditions.	Strongly agree: 100%	High	N/A	3, 10, 14–17
3	Does <i>H. pylori</i> eradication prevent peptic ulcer recurrence and ulcer-related bleeding? Eradication therapy reduces peptic ulcer recurrence and ulcer-related bleeding in <i>H. pylori</i> -infected patients, particularly those on long-term NSAIDs or aspirin therapy.	Strongly agree: 88%; agree: 12%	High	N/A	18–21
4	Does <i>H. pylori</i> eradication improve symptoms in patients with functional dyspepsia? <i>H. pylori</i> eradication leads to symptom improvement in a subset of patients with functional dyspepsia, with a modest but clinically relevant benefit that supports a test-and-treat approach in this population.	Strongly agree: 25%; agree: 75%	Moderate	N/A	22–30
5	Is “test-and-treat” approach appropriate for uninvestigated dyspepsia in Southeast Asian countries? The test-and-treat approach is effective and safe for uninvestigated dyspepsia in patients below the risk-stratified age threshold for endoscopy and without alarm features.	Strongly agree: 69%; agree: 31%	Moderate	N/A	26–29, 31, 32
6	Does gastric cancer remain a major cause of cancer-related mortality in Southeast Asian countries? Gastric cancer remains a significant contributor to cancer burden and mortality in certain Southeast Asian countries, particularly due to delayed diagnosis and persistent <i>H. pylori</i> infection.	Strongly agree: 88%; agree: 12%	Moderate	N/A	4, 33, 34
7A	Is community-based gastric cancer screening a feasible and effective strategy for early detection in Southeast Asian countries? We do not suggest routine community-based screening of gastric cancer in Southeast Asian countries.	Strongly agree: 76%; agree: 24%	High	Conditional	4, 35–38

(Continues)

TABLE 3 | (Continued)

CQ	Statement	Level of agreement	Level of evidence	Strength of recommendation	Supporting references
7B	We recommend identifying high-risk individuals and offering targeted screening as an effective, context-appropriate strategy for early gastric cancer detection in Southeast Asian countries.	Strongly agree: 83%; agree: 17%	High	Strong	4, 35–38
8	Should patients with gastric preneoplastic conditions and lesions be tested and treated for <i>H. pylori</i> and stratified for gastric cancer risk? We suggest that patients with gastric preneoplastic conditions and lesions should be tested and treated for <i>H. pylori</i> , and stratified for gastric cancer risk.	Strongly agree: 72%; agree: 28%	High	Conditional	39–44
9a	How should diagnostic tests for <i>H. pylori</i> infection be guided in Southeast Asian countries? We recommend that diagnostic tests should be selected based on clinical indication, cost, availability, and local validation.	Strongly agree: 94%; agree: 6%	Moderate	Strong	5, 9, 45–49
9b	Which test is suggested for population-based screening for <i>H. pylori</i> infection? We suggest that locally validated serology is suitable for population screening in certain Southeast Asian countries but requires a confirmatory test for active infection before treatment.	Strongly agree: 72%; agree: 28%	Moderate	Conditional	5, 9, 14, 26, 48, 50, 51
10	How should PPIs, PCABs, antibiotics, and bismuth be managed before testing? We recommend discontinuing PPIs and PCABs for ≥ 2 weeks and antibiotics/bismuth for ≥ 4 weeks depending on the test used to avoid false-negative results.	Strongly agree: 89%; agree: 11%	High	Strong	52–58
11	What are the optimal tests and timing for confirming <i>H. pylori</i> eradication? We recommend the UBT as the optimal test for confirming <i>H. pylori</i> eradication, performed at least 4 weeks after completion of eradication therapy, with prior discontinuation of PPIs/PCABs for ≥ 2 weeks.	Strongly agree: 83%; agree: 17%	High	Strong	5, 9, 45, 46, 51, 59–62
12	Should a test-and-treat strategy for <i>H. pylori</i> infection in dyspeptic patients be reimbursed? We recommend that healthcare systems in Southeast Asian countries should consider reimbursement of the test-and-treat strategy for <i>H. pylori</i> infection in dyspeptic patients, given its cost-effectiveness and long-term benefits in gastric cancer prevention.	Strongly agree: 78%; agree: 22%	Moderate	Strong	31, 63–65

(Continues)

TABLE 3 | (Continued)

CQ	Statement	Level of agreement	Level of evidence	Strength of recommendation	Supporting references
13	Is antibiotic resistance worsening in Southeast Asian countries? Resistance to metronidazole is high, whereas clarithromycin and levofloxacin resistance is rising. Tetracycline and amoxicillin resistance remain low.	Strongly agree: 79%; agree: 21%	High	N/A	8, 50, 66–79
14	What is the most effective and appropriate first-line regimen for <i>H. pylori</i> eradication in Southeast Asian countries? In regions with high clarithromycin resistance, a 14-day bismuth-based quadruple regimen is suggested as the first-line therapy. Where bismuth is unavailable, a locally validated regimen should be considered for first-line treatment. PCABs-based therapy may also be considered where resources permit.	Strongly agree: 74%; agree: 26%	High	Conditional	3, 9, 26, 80–96
15	What are the recommended second-line regimens for <i>H. pylori</i> eradication in Southeast Asian countries? Second-line therapy for <i>H. pylori</i> should be chosen according to the previously used regimen and local antibiotic resistance patterns. Recommended options include bismuth or nonbismuth quadruple therapy, 14-day PCABs-based therapy, or susceptibility-guided therapy where available.	Strongly agree: 84%; agree: 16%	Moderate	Strong	3, 9, 26, 75, 82, 97–108
16	When should antibiotic susceptibility testing be considered? Antibiotic susceptibility testing is recommended for patients who have failed at least two eradication regimens. It may also be considered prior to initiating therapy in settings where reliable culture or molecular testing is available.	Strongly agree: 74%; agree: 26%	Moderate	Conditional	3, 9, 82, 109–111
17	What are the recommended treatment options for <i>H. pylori</i> eradication in patients with confirmed penicillin allergy in Southeast Asian countries? For patients with penicillin allergy, bismuth-based quadruple therapy for 14 days is recommended as the first-line regimen. In settings where bismuth is not available, alternative options should be selected according to local resistance patterns and patient tolerance. PCABs-based regimens may be considered.	Strongly agree: 89%; agree: 11%	Moderate	Strong	3, 9, 82, 112–119
18	What is the clinical role of PCABs in the treatment of <i>H. pylori</i> infection in Southeast Asian countries? PCABs-based regimens can be used as a rescue therapy for <i>H. pylori</i> infection, where available.	Strongly agree: 63%; agree: 37%	Moderate	Conditional	80, 90–92, 95, 96, 106–108, 117, 120, 121

(Continues)

TABLE 3 | (Continued)

CQ	Statement	Level of agreement	Level of evidence	Strength of recommendation	Supporting references
19	What are the recommended empirical rescue therapy options for <i>H. pylori</i> eradication when antibiotic susceptibility testing is not available in Southeast Asian countries? Empirical rescue therapy for <i>H. pylori</i> should be guided by the patient's prior antibiotic exposure, local resistance patterns, and drug availability.	Strongly agree: 84%; agree: 16%	Moderate	Strong	3, 9, 75, 82, 106, 109, 122–130
20	Should confirmation of <i>H. pylori</i> eradication be performed after treatment? Posttreatment confirmation of <i>H. pylori</i> eradication is recommended to ensure therapeutic success.	Strongly agree: 89%; agree: 11%	High	Strong	53, 54, 56, 109, 131–135
21	What is the rate of <i>H. pylori</i> reinfection after successful eradication in Southeast Asian countries? In Southeast Asian countries, the annual reinfection rate of <i>H. pylori</i> after successful eradication remains low.	Strongly agree: 78%; agree: 22%	Moderate	N/A	136–143

Note: Strength of recommendation was assigned only to statements that explicitly recommended or suggested a clinical action. Descriptive, epidemiological, or evidence-synthesis statements were assigned a level of evidence but were not assigned a strength of recommendation and are therefore reported as N/A.

Abbreviations: BQT, bismuth quadruple therapy; N/A, not applicable; PCAB, potassium-competitive acid blocker; PPI, proton pump inhibitor; UBT, urea breath test.

In conclusion, The Bangkok II Consensus Report provides comprehensive, updated, and regionally relevant recommendations for the management of *H. pylori* infection in ASEAN countries. The principal messages are that *H. pylori* remains an important public health threat; eradication therapy should be viewed as a cancer- and ulcer-prevention strategy; diagnostic testing should be chosen according to indication, validation, and access; empirical treatment should account for high clarithromycin resistance; and posttreatment confirmation of eradication is essential. Implementation of these recommendations will require coordinated action among clinicians, professional societies, healthcare systems, and policymakers across ASEAN. Priority areas include strengthening local validation of diagnostic tests, improving access to effective eradication regimens and test-of-cure, expanding antibiotic resistance surveillance, and generating prospective regional outcome data. With continued collaboration, these recommendations can support more consistent, effective, and context-appropriate *H. pylori* management throughout Southeast Asia.

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Conflicts of Interest

All authors declare that they have no conflicts of interest relevant to this manuscript except Tiing-Leong Ang is an Editorial Board member of JGH and co-author of this article. To minimize bias, he was excluded from all editorial decision-making related to the acceptance of this article for publication.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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